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ABSTRACT

The relationships among factors reported on school district (SD) report cards were studied for 121 Tennessee SDs. The report cards provided data on student outcomes (achievement test scores) and SD characteristics. Relationships were studied through linear regression, Pearson product moment correlation, and Guttman's partial correlation. Six research questions guided the study: (1) how SD characteristics currently provided on the report cards relate to academic achievement; (2) how reported SD characteristics relate to each other; (3) how SDs perform in terms of the SD and community characteristics reported; (4) whether reported SD characteristics represent all factors that influence student achievement; (5) whether outlier SDs influence this study's findings significantly; and (6) how this study's findings can inform educational policy at state and local levels. The eight factors studied accounted for only 26.5% of that which was related to mean student outcome (MSO) (test scores). Significant correlations were found among 14 of 18 factor combinations. When SDs were rank-ordered, money was not the critical factor in SD performance. The reported characteristics did not represent all of the variables affecting outcome. Outlier schools (top and bottom 10 percents) affected the relationship between the variables considered and MSO. Ways in which these findings can improve educational policy are discussed. Six tables, 22 figures, and a four-item list of references are included. (SLD)

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WHAT DO SCHOOL REPORT CARDS REALLY TELL US?

(An Analysis of the Relationships among Factors Commonly Reported in School District Report Cards)

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WHAT DO SCHOOL REPORT CARDS REALLY TELL US?

(An Analysis of the Relationships among Factors Commonly Reported in School District Report Cards)*

I. INTRODUCTION

The development and publication of report cards on schools have become commonplace. The concept accompanies the great interest nationwide in outcomes-based education, school accountability based on student performance, and clear communication of student, school and school district achievements to the general public. However, little attention has been given to the value of report card data.

In Tennessee, a report card on schools contains information on student academic achievement (usually average test scores), school and/or district educational expenditures, community per capita income, student enrollments, student attendance, professional personnel, professional salaries, average class sizes and assorted other factors deemed to be important to understanding education in the community and providing appropriate points of comparison with other schools or districts in the state and region. Generally, a reader does not know what relationship the entries have to each other or to student achievement, if that is considered to be the "bottom line." While the inclusions imply to readers that the factors reported determine, or at least strongly influence, student achievement, that relationship is rarely stated or investigated.

The purpose of this study was to determine the relationships among factors reported on one set of report cards—those developed for local school districts within TN. The analysis provided information about the relationship of various factors to student outcomes and information about the value of the factors themselves. The former information should be of value to policymakers and educators attempting to determine where and how to allocate resources (money, personnel, etc.). The latter information should be useful to educators and policymakers who are developing or refining report cards.

II. TENNESSEE'S (TN) REPORT CARDS

Each year, Tennessee's State Board of Education produces a report card for each school district using data provided by the school system and the State Department of Education. The report cards report district level data; i.e., individual school data are not reported. In its current format, a school district's report card contains both student outcome data (testing information) and other school district data. Figures 1 and 2 display a typical report card for "Widget" city school district.

As can be seen in Figures 1 and 2, the information is organized under two sections: (1) Testing information, (2) School Information for "Widget" City. The second section is subdivided to include: (a) System Information, (b) Professional Educator Information, and (c) Student information.

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* This is an expanded version of an earlier paper titled *Role of School District Report Cards" (Why Do We Bet on .25 With .75 Running Loose?)*, present at the National Council of Professors of Educational Administration (NCPEA), August 13, 1991. (ERIC TM 017 428)

Testing Information for Widget City		Grade Level	1987-88	1988-89	State Average
Basic Skills First Achievement Test (percent score)	Reading	3	90	88	80
		6	82	80	77
		8	92	91	81
	Math	3	91	90	82
		6	67	71	66
		8	77	84	66
Stanford Achievement Test (Stanine score) 7-9 = High 4-6 = Average 1-3 = Low	Reading	2	6	7	6
		5	6	6	5
		7	6	6	5
	Math	2	7	8	6
		5	7	6	6
		7	7	7	5
	Spelling	2	6	7	6
	Language	5	6	6	5
		7	6	6	5
	Environment	2	7	7	6
	Science	5	6	7	6
		7	6	6	5
	Listening	2	7	7	5
		5	6	6	5
		7	6	6	5
	Social Science	5	6	6	5
		7	6	6	5
Stanford Test of Academic Skills (TASK 2) 7-9 = High 4-6 = Average 1-3 = Low	Reading	9	6	6	5
		12	6	6	5
	Math	9	6	6	5
		12	6	6	5
	English	9	7	6	5
		12	6	7	5
	Science	9	7	6	5
		12	6	6	5
	Social Science	9	5	6	5
		12	6	5	5
Tennessee Proficiency Test (% Students Passing)	Language	9	88	92	78
	Math	9	95	98	90
	Both	9	86	91	76

Figure 1 Achievement tests found on a typical school district's Report Card.

System Information for Widget City		Grade Level	1986-87	1987-88	1988-89	State Average
Number of Schools		K-12	5	5	5	12
Average Daily Membership		K-12	3,291	3,394	3,372	5,874
% Student Attendance		K-12	95.7	95.3	95.1	93.6
% Enrollment Change		9-12	-13.0	-16.1	-15.2	-24.7
% Oversized Class		K-12	1.2	1.4	2.3	3.8
% of Students on Free or Reduced Price Lunch		K-12	23	21	21	42
Expenditures per pupil		K-12	$2,718	$3,299	$3,501	$3,304
County Per Capita Income		K-12	"	"	$12,819	$12,878
% Elementary Schools Accredited by SACS		K-8		100.0	100.0	29.1
% Secondary Schools Accredited by SACS		7-12	100.0	100.0	100.0	64.9
Professional Educator Information						
% Professionals on Career Ladder Levels II & III		K-12	22.9	21.9	25.6	14.8
Average Professional Salary		K-12	$25,198.60	$26,085.44	$30,804.37	$26,756
Student Information						
% Diplomas Granted	Regular	12	90.6	68.7	75.8	81.8
	Honors	12	49.6	26.7	20.0	8.5
	Special Education	12	1.8	1.4	1.5	1.9
	Certificate of Attendance	12				0.9
	Seniors not Receiving Diploma in Spring Graduation	12	2.7	3.2	2.7	6.9
% Students in Vocational Education Courses		7-12	33.0	40.9	41.0	45.5
% Students in Special Education		K-12	12.1	11.3	12.1	14.2
% Chapter 1 Students		K-12	13.3	15.5	12.4	11.9

Figure 2. General information found on a typical school district's report card.

The Testing information is organized under four headings which include grade level, the prior school year (1987-88), the present school year (1988-89), and state average. School System information is organized under five headings which include grade level, two years prior data (1986-87), one year prior (1987-88), present year (1988-89), and state average. In Tennessee, each school district's report card defines all categories. The three sets of testing information reported are divided and described as follows:

a **Basic Skills First Achievement Test (BSF)** *The BSF is administered to students in grades 3, 6, and 8. This test measures how well students have mastered essential reading and mathematics skills. These scores show the average percent of skills mastered by students in your school system.* (This study used the 1989, 8th-grade data.)

b. **Stanford Test of Academic Skills (TASK 2) (STAT)** *The STAT is administered to students in grades 2, 5, 7, 9, and 12. These tests show how students perform when compared to students at the same grade nationwide. These scores are reported as stanines. Stanines are scores from one to nine, where one is low and nine is high. An average score is four, five, or six. These scores show the*

average stanine on each part of the test for the students in your school system. (This study used the 1989, 12th-grade data.)

c. **Tennessee Proficiency Test (TPT)** *The TPT measures minimum skills in mathematics and language arts. Students must achieve a passing score of 70 percent correct on both the math and language arts tests in order to fulfill one of the requirements for receiving a regular diploma. Students take the test for the first time in the ninth grade.* (This study used the 1989, 9th-grade data.)

Seven of the eight categories of report card information used for this study are defined by report card developers as follows (*Average Daily Membership* was not specifically defined):

a. **County per Capita Income (CCI)** *This figure represents the per capita personal income for the county in which your school system is located. The most recent figures available from the U.S. Bureau of Economic Analysis are for 1987.*
b. **Average Professional Salary (APS)** *This figure shows the* ***estimated*** *average salary for all certificated personnel in your school system.*
c. **Expenditures per Pupil (EPP)** *This figure shows the average number of dollars spent for each pupil in average daily attendance for your school system.*
d. **Average Daily Membership (ADM)** (*The Report Card did not provide a definition for this category*).
e. **Percent of Students in Attendance (%SA)** *This figure shows the average percent of students in attendance daily in the individual school districts for the school years 1986-87, 1987-88, 1988-89.*
f. **Percent of Oversized Classes (%OC)** *This figure shows the percent of classes in all grade levels which had waivers for being over the maximum class size. Maximum class sizes in Tennessee are: 25 for grades K-3, 28 for grade 4, 30 for grades 5-6, 35 for grades 7-12, and 23 for vocational.*
g. **Percent of Students on Free or Reduced Lunches (%FRL)** *Students whose family income meets certain criteria are eligible for free or reduced price lunches. This figure shows the percent of students in your school system who receive free or reduced price lunches.*
h. **Percent Professionals on Career Ladder Levels II and III (%CL)** *This figure shows the percent of professional staff in your school system who have met the standards for Career Levels II and III. These are the upper rungs of Tennessee's Career Ladder program. The number includes regular classroom teachers, guidance counselors, librarians and administrators.*

The investigators chose the above categories (*including ADM*) in addition to test results for detailed study. These eight categories were chosen because many educators and lay persons believe that they have great impact on student academic performance.

III. METHODOLOGY

Investigators used the 1988-89 report cards as the basis for the study. Although the report cards provided test results at several grade levels, only the average scores for the highest grade levels reported were used in these analyses. Those scores were considered as best representing the final product of the school system. Six research questions guided the study:

1. How do school district characteristics currently reported in the report cards relate to reported student academic achievement?
2. How do reported school district characteristics relate to each other?
3. When rank ordered on the basis of student outcomes, how do school districts within the state perform in terms of the district and community characteristics reported in the report card?
4. Do the reported school district characteristics appear to represent all factors which influence student academic achievement?

5. Do "outlier" school districts significantly influence the findings of this study?
6. How might the findings of this study inform educational policy at state and local levels?

Investigators treated student outcome data (test data) as the dependent variable and other characteristics reported as independent variables which influence student outcomes. Several types of analyses of the available data were conducted.

First, profiles of all school districts in the state were produced, as well as profiles of the 121 school districts constituting the final sample. These profiles provided a statewide picture and helped researchers to determine if the study sample varied in any significant way from the state composite.

To develop a response to research question #1, three analyses were conducted. First, a linear regression model was used to assess the relationship between each reported characteristic and the school district's mean student outcome (MSO). Since three different sets of test scores were reported, it was necessary to combine them to create a mean student outcome measure for each school district. To create the MSO, the mean scores reported for each test were first converted to z-scores. The z-scores were then used to compute the MSO. Only school districts reporting scores for all three tests (8th grade BSF; 12th grade STAT; and 9th grade TPT) could be used. Therefore, only 121 of TN's 139 school districts were in the final sample. A Pearson Product Moment correlation was developed as a means of comparing categories.

The second analysis for the first research question used two procedures. First, report card information was reorganized into three clusters: testing, money, and school system information. That structure is outlined below:

1. Testing information
   - Basic Skills First Achievement Test (BSF)
   - Stanford Test of Academic Skills (Task 2) (STAT)
   - Tennessee Proficiency Test (TPT)
2. Money Information
   - County per Capita Income (CCI)
   - Average Professional Salary (APS)
   - Expenditure per Pupil (EPP)
3. School System Information
   - Average Daily Membership (ADM)
   - Percent of Student in Attendance (%SA)
   - Percent of Oversized Class (%OC)
   - Percent of Student on Free or Reduced Lunches (%FRL)
   - Percent Professionals on Career Ladder Levels II and III (%CL)

The purpose of this clustering was to facilitate investigation of the interactions of multiple, related categories with student outcomes and with each other. All data for categories clustered as "Money" or "School System" were converted to z-scores, then the Pearson Product Moment correlation was applied.

The third analysis employed Guttman's partial correlation procedure. Once partial correlations were developed for each category, they could be converted to percentages of influence, thereby enabling

investigators to determine the relationship of each independent variable (category) to the dependent variable (mean student outcome).

To answer research question #2, investigators computed correlations among independent variables (categories in the Money and School System clusters). A *coefficient of determination* (r^2) was used to determine the levels of interaction between categories within a cluster and across clusters.

Research question #3 required the rank ordering of school districts within the sample by mean student outcome. After completing the rank ordering, investigators focused attention on the nine school districts exhibiting the highest MSOs and the nine demonstrating the lowest MSOs.

Research question #4 required no further statistical analyses. The partial correlation coefficients and related percentages of influence developed in response to research question #1 provided the necessary data.

Research question #5 was formulated to allow investigators to examine the effects of "outlier" school districts (those at the extremes of the ranking continuum) on the statewide profile of relationships among variables. To respond to this question, the top 10% and bottom 10% of the school districts in each independent variable (student attendance, oversized classes, etc.) were eliminated from consideration, and a new Pearson Product Moment correlation coefficient for each independent variable and Mean Student Outcome (MSO) was computed. Fisher's Zr-transformation was then used to evaluate the significance of the relationship between the two correlation coefficients (MSO and Truncated MSO).

Research question #6 was created as a means of focusing conclusions and implications of the study. The development of report cards on schools and the demographic data reported in them reflect unstated assumptions about their relationship to a great extent. If the findings of this study have any value, it may well be the informing of policymakers and policy.

IV. FINDINGS

Findings of the study are reported in two areas: descriptive analyses of school districts and responses to the research questions.

A. Descriptive Analyses of School Districts

1. The 1988-89 Profile of TN's 139 School Districts

A profile of TN school districts (n=139) by Report Card category was developed (see Table 1.). For each category, mean score, standard deviation, number of schools submitting data and range of scores or numbers were compiled.

Table 1. A "Report Card" Profile of Tennessee's 139 School Districts in 1988-89.

139 SCHOOL DISTRICTS

	SD	n	Report Card Max	Min.	Mean
OUTCOMES					
Basic Skills First Achievement Test			(Percent passing): 8th grade		
Reading	4.9	134	93	65	81
Math	7.6	134	85	43	66
Stanford Test of Academic Skills; Task 2			(Stanine score): 12th grade		
Reading	.5	121	7	4	5
Math	.5	121	6	4	5
English	.6	121	7	4	5
Science	.5	121	6	3	5
Social Studies	.5	121	6	4	5
Tennessee Proficiency Test			(% Students passing): 9th grade		
Language	7.1	124	98	56	76
Math	6.4	124	100	59	90
Both	9.4	124	98	48	76
MONEY					
Co./Capita Income ($)	2,030	139	19,318	6,934	12,878
Student Expenditure ($)	505	139	4,891	2,163	3,304
Aver. Prof. Salary ($)	2,683	139	34,796	21,015	26,756
SCHOOL SYSTEM					
Average Daily Mem. (#)	11,702	139	104,788	188	5,874
Student Attendance (%)	1.3	139	97.1	90.3	93.6
Oversized Class (%)	4.6	122	21.5	0.1	3.8
Free/Reduced Lunch (%)	4.3	139	86.0	9.0	42.5
Career Ladder II/III (%)	6.1	138	41.5	4.1	14.8

a. Outcome Data

Of the 139 TN school districts, 96% reported BSF scores, 89% reported TPT scores, and 87% reported STAT scores. An average of 81% of all students taking the 8th grade BSF in 1988-89 passed the Reading sub-test, and 66% passed the mathematics component. Just over 76% of all students completing the TPT passed both the mathematics and language components. More students passed the mathematics sub-test (90%) than the Language component (76%), a reversal of the results on the BSF, usually given a year earlier. In 1988-89, the mean scores of 12th grade students taking the STAT was near the 5th stanine (4.8-5.3) on all five sub-tests. Scores on all three tests ranged from several standard deviations below to several above the mean.

b. Money Matters

In the **Student Expenditure Per Year** category, students in the richest school district were supported by $4,891 per year and the students in the poorest district by $2,163 per year, a $2,728 per year difference between the richest and poorest districts . The mean **County per Capita Income** was $12,878, with a range from $19,318 to $6,934 (*an approximate 300% difference*). The **Average Professional Salary** mean was $26,756, with a range from $34,796 to $21,015.

c. School System characteristics

All TN districts provided **Average Daily Membership** (ADM) category data. The average school districts' daily attendance was 5,874 students. The largest district had 104,778 students and the smallest district had 188 students. The percent of **Student Attendance** (%SA) for the top school district in this category was two SDs above the mean and for the bottom school district, two SDs below the mean. The top district had 97% attendance and the lowest district had 90% attendance—a 7% difference. Percent of **oversized classes** (%OC) was reported by 122 school districts. State class size restrictions in 1988-89 were 25 students in grades K-3, 28 students in grade 4, 30 students in grades 5-6, 35 students in grades 7-12, and 23 students in vocational classes. An oversized class was any class exceeding these numbers. The percentage of oversized classes reported ranged from 0.1% to 21.5%.

Students participating in the **Free or Reduced Lunch** (%FRL) program in 1988-89 ranged from a low of 9% to a high of 86%. This category is one common (but usually understated) indicator of the socio-economic status (SES) level of families served by the school.

Tennessee has one of the few operational career ladder programs for professional educators (teachers, administrators, other) in the country. Since 1984, professional educators have been able to apply for evaluation for levels I, II, and III on the Career Ladder and receive merit pay as well as extended contract opportunities, if they achieve the upper rungs (Levels II, III). In 1988-89, approximately 15% of all professional educators had achieved **Career Levels II and III** (%CL) as indicated in the report cards. Percentages of educators at these levels in individual school districts ranged from 4% to 42%.

2. Descriptive Analysis of 121 TN School Districts Reporting Necessary Student Outcome Data

Student outcomes were a major focus of this study, so school districts that did not report all three sets of test scores were excluded from further investigation. Of 139 school districts, 121 provided the necessary student test data. The profile for these 121 school districts did not vary greatly from that of the total 139 districts (see Table 2.). Means for the outcomes measure remained constant. Mean County/district per capita income dropped 75 dollars. Average per pupil expenditure rose 19 dollars. Average professional salary fell 84 dollars. Average Membership rose 689 students. The percentage of oversized classes dropped 0.4%. Percentage of

Table 2. A Report Card Profile of 121 Tennessee School Districts sampled.

121 SCHOOL DISTRICTS

	M	SD	n	Max	Min.	Report Card Mean
OUTCOMES						
Basic Skills First Achievement Test				(Percent passing): 8th grade		
Reading	82.3	4.9	121	91	65	81
Math	67.6	7.7	121	85	43	66
Stanford Test of Academic Skills; Task 2				(Stanine score): 12th grade		
Reading	5.2	0.5	121	7	4	5
Math	5.2	0.5	121	6	4	5
English	5.3	0.6	121	7	4	5
Science	4.8	0.5	121	6	3	5
Social Studies	4.8	0.5	121	6	4	5
Tennessee Proficiency Test				(% Students Passing): 9th grade		
Language	78.7	8.6	121	98	56	76
Math	90.5	6.4	121	98	59	90
Both	77.2	9.3	121	98	48	76
MONEY						
Co./Capita Income ($)	10,860	1,962	121	19,318	6,934	12,878
Stud. Expenditure ($)	3,038	509	121	4,891	2,318	3,304
Aver. Prof. Salary ($)	24,935	2,693	121	34,797	21,286	26,756
SCHOOL SYSTEM						
Average Daily Mem.(#)	6,564	12,395	121	104,788	375	5,87 4
Student Attendance (%)	93.5	1.3	121	97.1	90.3	93.6
Oversized Class (%)	5.8	4.1	110	21.5	0.1	3.8
Free/Reduced Lunch (%)	39.7	14.5	121	86.0	9.0	42.0
Career Ladder II/III (%)	14.9	5.9	121	41.5	4.1	14.8

students in the free or reduced lunch program rose 0.5 percent, and percentage of career Level II and III teachers dropped 0.2 percent.

B. Findings Pertinent to Research Questions (*All correlations appear in the correlation matrix, Figure 13, p. 18*)

1. How do school district characteristics currently reported in the report cards relate to reported student achievement?

A linear regression model was used to assess the relationship between each reported characteristic and the school district's mean student outcome (MSO). In addition, by using the state mean and MSO, outlier school districts were identified. Below are the results of this analysis reported by characteristic.

a. Influence of County Per Capita Income (CCI)

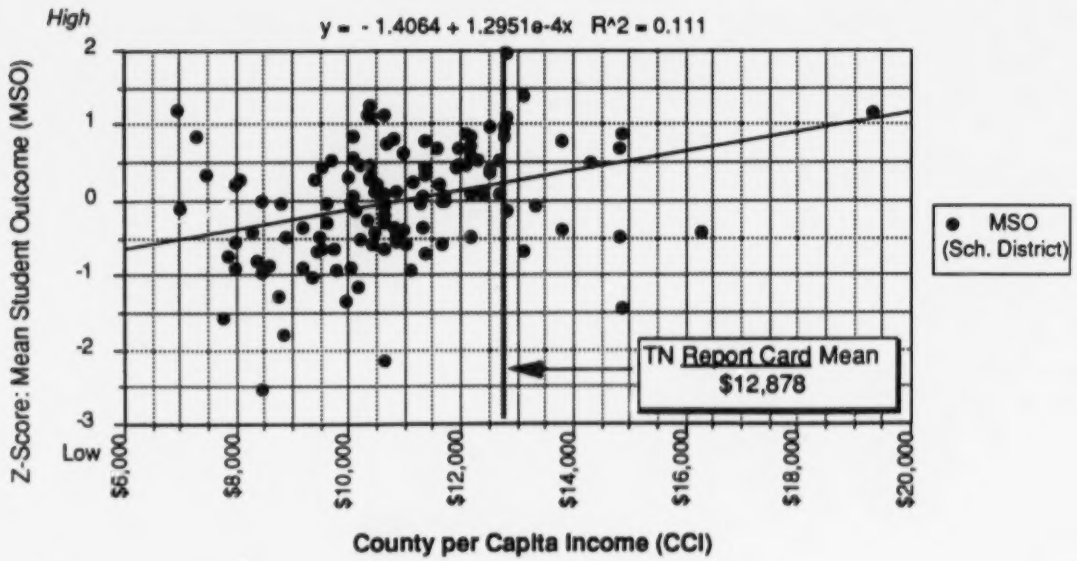

Figure 3. Relation of Per Capita Income to Mean Student Outcome.

As indicated in Figure 3, there is a positive correlation between MSO and CCI. The regression line intercepts the MSO zero z-score mean at $11,000, a point $1,800 below the state average per capita income of $12,878. Generally, school districts with greater per capita incomes demonstrated higher student test scores (r=.31). However, it should be noted that most (i.e., ~9:1 ratio) school districts' per capita income falls below the reported state mean ($12,878).

Even while a positive relationship between per capita income and test results was demonstrated, there were "outlier" districts; i.e., districts that did not follow the trend. Four districts had per capita incomes at least $2,000 below the state mean, but had mean student outcomes at least one standard deviation above the mean. One of these districts had a per capita income almost $6,000 below that mean.

b. Influence of Average Professional Salary (APS)

There was a significant positive correlation between size of professional salary and student achievement (r=.44) — the highest positive correlation for the three money categories. The mean professional salary for the state in 1988-89 was $26,756, but the salary ranged from a low of $21,000 to a high of $35,000 (see Figure 4). Most school districts (~4:1 ratio) have a smaller APS than the state mean of $26,756.

Generally, school districts with higher mean professional salaries demonstrated higher MSO's. However, this category also displayed "outlier" school districts. One of the nine districts with the highest mean student

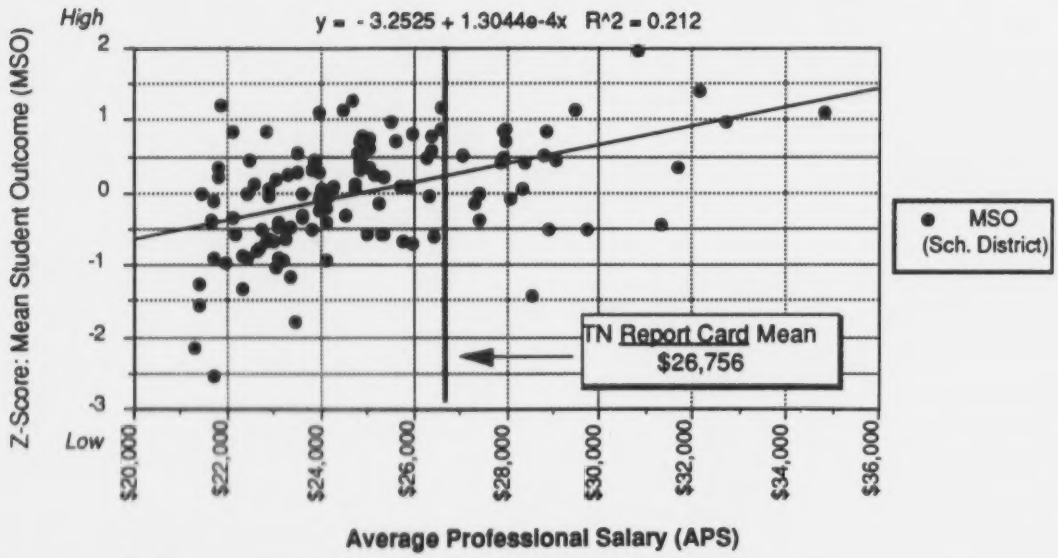

Figure 4. Relation of Average Professional Salary to Mean Student Outcome.

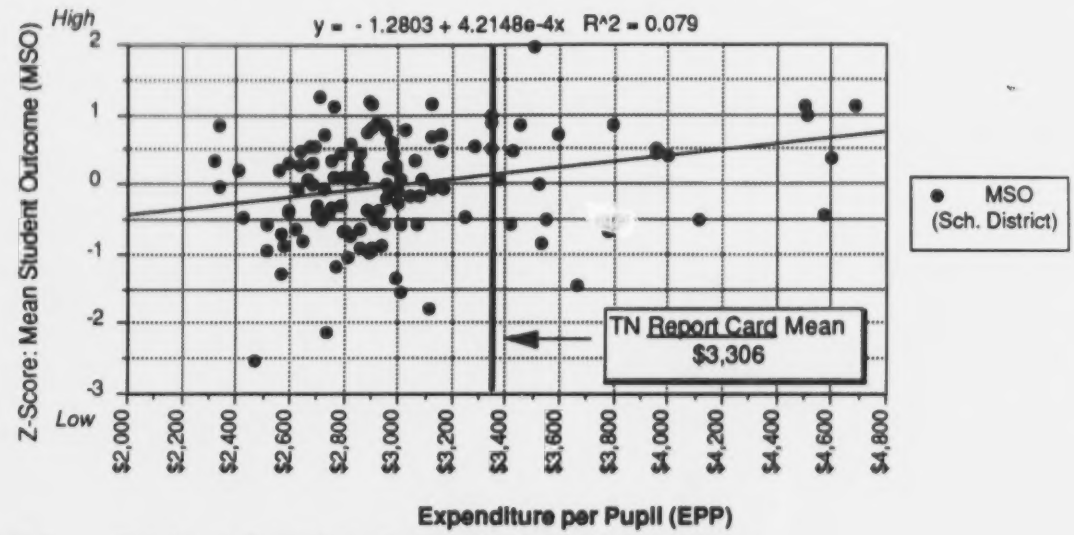

Figure 5. Relation of Expenditure Per Pupil to Mean Student Outcome.

outcomes in the state had a professional salary average of less than $22,000, another's MSO was $24,000, and two others had means under $25,000. Of the nine districts with the lowest MSO z-score, all but one were below the APS state average.

c. Influence of Expenditure Per Pupil (EPP).

The majority of TN school districts did not expend the state mean EPP of $3,306 (~4:1 ratio). The trend

line in Figure 5 shows a small positive correlation between student outcomes and money spent per student (r=.22). The EPP correlation was the smallest of the three money category correlations.

While districts with higher expenditure per student tended to have slightly higher student outcomes than their fellow districts, six of ten school districts with MSOs at or exceeding one standard deviation above the mean were below the state mean in money spent per student. Two of those districts spent at least $500 less than the mean, and four of them spent at least $400 less. For every TN school district above the mean EPP, four were below the 1988-89 report cards' EPP mean.

d. Influence of Average Daily Memberships (ADM).

There was no significant correlation between size of school district (as measured by ADM) and student outcomes. The slight correlation which did exist was negative (r= -.09), meaning that larger size tended to influence student performance negatively.

The state mean ADM of 5,874 students per district was obviously influenced by a few large school districts, since most districts clustered below that mean (three districts below for every one above--see Figure 6). In actuality, 83% of TN school districts reported fewer than 15,000 students. Only 10 school districts had enrollments above that figure, and two districts had very large enrollments when compared to the rest.

e. Influence of Student Attendance (%SA)

A significant, positive correlation (r=.41) existed between student attendance and student achievement (MSO). Generally, where average daily membership was greater, achievement was higher.

As portrayed in Figure 7, state average attendance in 1988-89 was 93.6%. Most school districts exceeded this average by a ratio of ≈ 7 to 4. All districts whose attendance averaged 92% or less demonstrated MSO z-scores at or below zero; 6 of 8 districts where average attendance exceeded 96% had positive MSO z-scores.

f. Influence of Oversized Class (%OC)

Of the 121 school districts studied, 110 reported oversized class data. There was a significant, negative correlation between the percentage of oversized classes in a district and mean student outcome (r=-.30). Generally, districts with larger numbers of oversized classes had lower mean student outcomes and vice versa. [1]

Among the 110 school districts reporting oversized classes, the average percentage of classes exceeding regulations was 3.8 (see Figure 8). Of the nine school districts with MSO z-score of negative one SD or below,

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1 This is an interesting finding considering the results of Tennessee's massive, four-year longitudinal/class-size study, Project STAR, which showed convincingly the benefits to student achievement of reduced class size (to 1:15) in primary grades (Finn & Achilles, 1989; Word, et. al., 1989). STAR, however, assessed grades K-3; this analysis focused on all grades and total school district.

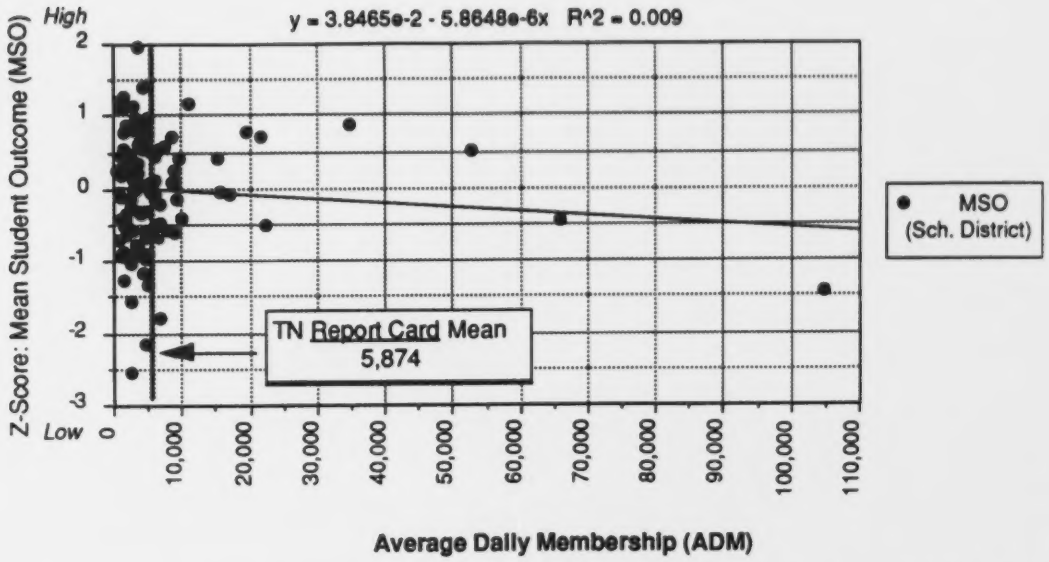

Figure 6. Relation of Size of School District (Average Daily Membership) to Mean Student Outcome.

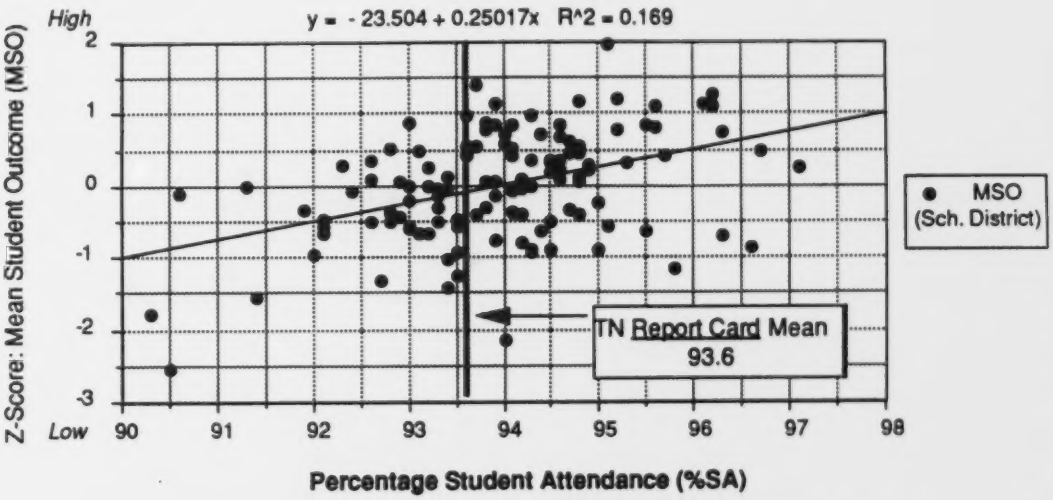

Figure 7. Relation of Percentage of Student Attendance to Mean Student Outcome.

seven exceeded the average percentage of oversized classes. Of the 9 school districts with an MSO z-score of plus one or above, only 3 exceeded the state average of 3.8%. Thirty-seven districts that reported percentages of oversized classes greater than the state mean demonstrated mean student outcomes at or above the state mean. Fifteen districts reporting a percentage of oversized classes below the state mean also had MSO z-scores below zero. The impact of class size cannot be simply interpreted.

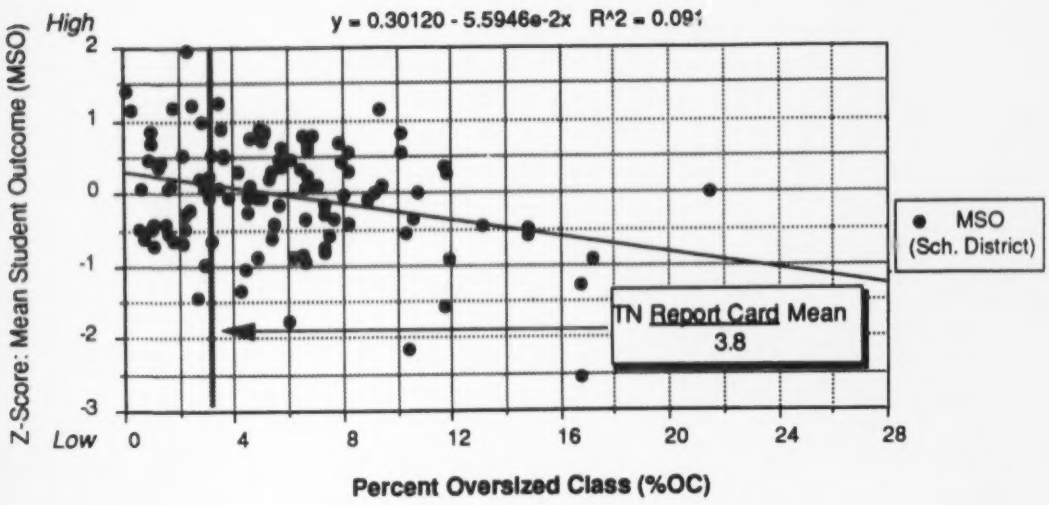

Figure 8. Relation of Percent Oversized Class to Mean Student Outcome.

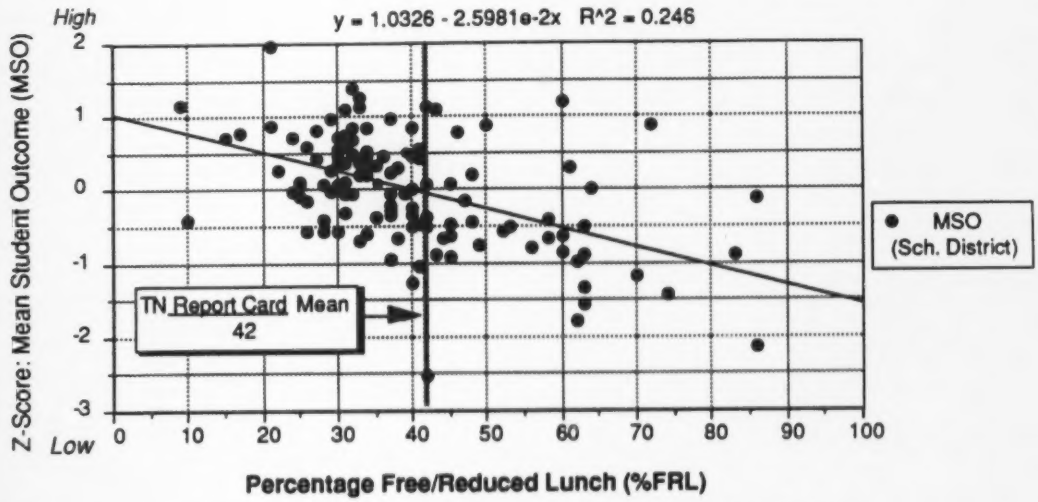

Figure 9. Relation of Percentage Free or Reduced Lunch to Mean Student Outcome.

g. Influence of Free or Reduced Lunch as Socio-Economic Status Indicator (%FRL)

The percentage of free and reduced lunches (FRL) creates one indicator of socio-economic status (SES) of the community; the higher the percentage of free and reduced lunches, the lower the SES of the community. As Figure 9 indicates, there was a significant negative correlation between %FRL and mean student outcome (r=-.49). School districts with lower percentages of free and reduced lunches generally had higher MSO z-scores.

The average %FRL statewide was 42%. However, two-thirds of all school districts reported percentages of FRL below the state average. Seven of the nine districts with MSO z-scores of negative one SD or below had larger %FRL than the state average, and five of the six school districts with the highest percentages of free and reduced lunches demonstrated negative MSO z-scores. Alternatively, seven of the nine districts with MSO z-scores of plus one or higher had lower than state average percentages of free and reduced lunches. However, in this category, as in others, there were"outlier" districts. Two of the nine districts with MSO z-scores above plus one were above the state average for %FRL. One of those districts had 60% of its students on free and reduced lunches.

h. Influence of Percentage of Career Ladder (%CL) Teachers

Since TN's Career Ladder program is intended to identify and reward outstanding teachers, it could be assumed that a high percentage of Career Ladder II & III teachers in a school district indicated good instruction in that district. However, the reverse could not be assumed. Low percentages of Career Ladder II & III teachers did not necessarily suggest poor instruction, because the Career Ladder program is optional. Teachers can choose to be evaluated for Career Ladder status.

There was a significant but modest positive correlation between percentage of Career Ladder teachers in a district and student outcomes (r=.31). The trend line in Figure 10 suggests that the greater the number of Career Ladder teachers, the higher the MSO. The four school districts with the lowest MSO z-scores also had

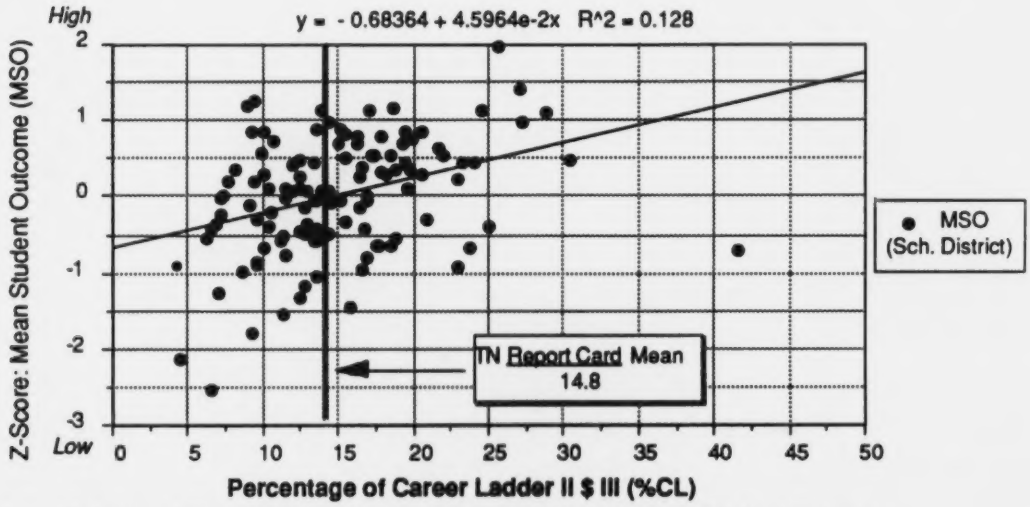

Figure 10. Relation of Percentage of Career Ladder Teachers to Mean Student Outcome.

low percentages of Career Ladder teachers.

The average percentage of upper-level Career Ladder teachers statewide was 14.8%, and slightly more districts reported percentages below that average than above (a 7:5 ratio). While seven of the ten districts generating the highest MSO z-scores reported more upper-level Career Ladder teachers than the state average, there were also "outlier" districts in this category. The district with the highest percentage of upper-level Career Ladder teachers had a mean student outcome well below the state mean. Greater numbers of upper-level Career Ladder teachers were not a guarantee of better student performance. Note also that Career Ladder status is not independent of years of teaching experience. A teacher has to have eight years of experience to reach Career Level II and twelve years of experience to reach Career Level III.

I. Relationships of the Money, and School System Clusters to mean Student achievement (Mean Student Outcome [MSO]).

The three Money characteristics (per capita income, per pupil expenditure, and average professional salary) when combined, produced a significant positive correlation (r=.41) with MSO (see Figure 11). This finding is not surprising since each characteristic individually provided a positive correlation.

However, four school districts with money z-scores below zero produced mean student outcomes at least one SD above the state mean, and one school system with a money z-score one and one-half SDs above the mean produced a mean student outcome one and one-half standard deviations below the mean.

Data in Figure 12 show that the five school system factors (*percent student attendance, percentage of free or reduced lunches, percentage of oversized classes, percentage of Career Ladder teachers and average daily membership*), when combined, produced a moderately high, significant positive correlation (r=.50) with MSO. Based on the sizes of the correlation coefficients, one could say that these school system characteristics relate to student outcomes more than do the reported money factors. While fiscal resources are important to student achievement, this finding suggests that other factors within a school district may be equally or more important.

Of the eight factors (see Figure 13) studied for their relationships to MSO, five demonstrated significant ($p \leq .01$) positive correlations:

1. Average Professional Salary (r=**.44**)
2. Student Attendance (r=**.41**)
3. County Per Capita income (r=**.31**)
4. Number (percentage) of Career Ladder Teachers II & III (r=**.31**)
5. Expenditure Per Student (r=**.22**)

Two factors yielded significant negative correlation with student outcomes:

1. Number (percent) of Free or Reduced Lunches (r= **-.49**)
2. Number (percent) of Oversized Classes (r= **-.30**)

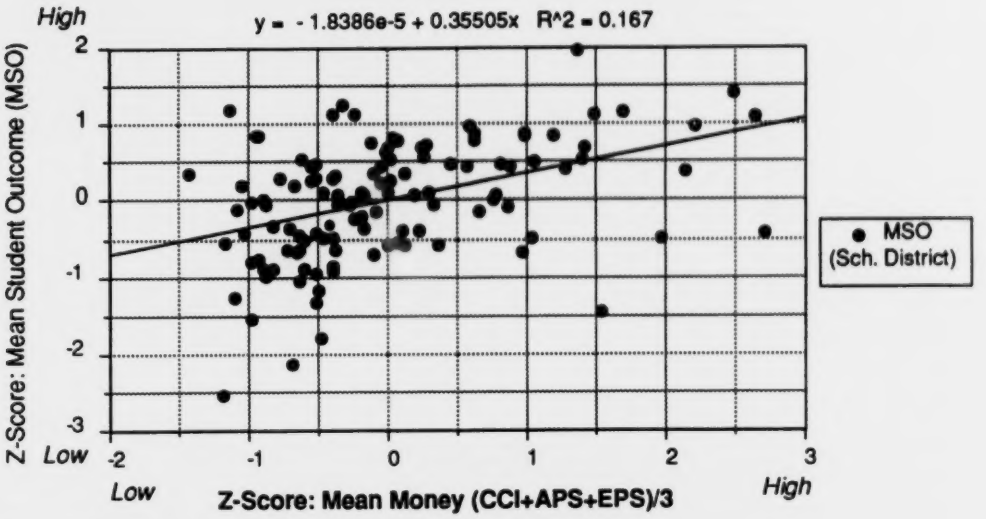

Figure 11. Relation of Combined Money Factors to Mean Student Outcome.

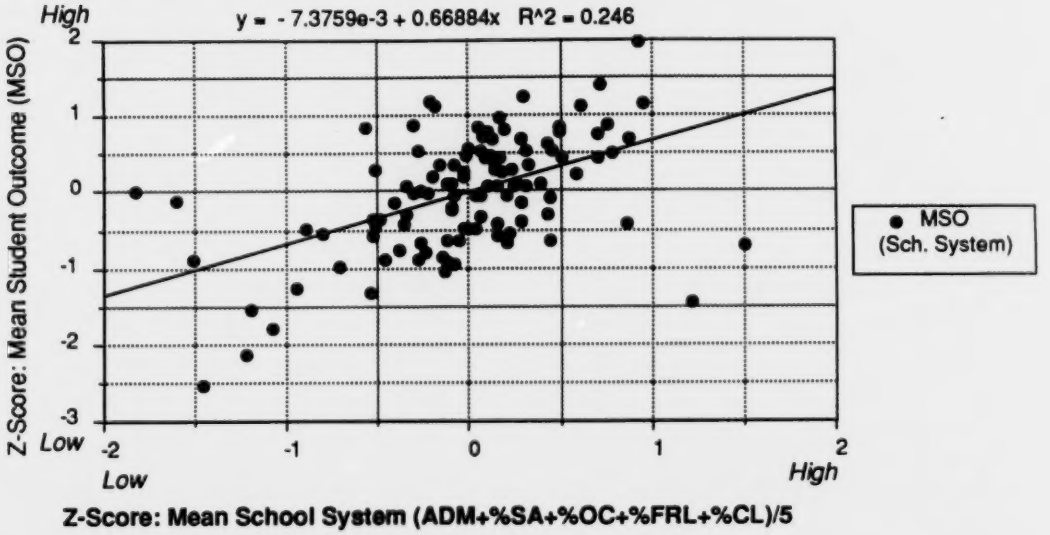

Figure 12. Relation of School System Factors to Mean Student Outcome.

One factor did not show either a significant positive or significant negative correlation with MSO: Size of School District (Average Daily Membership).

However, these correlations do not fully answer research question #1. To refine the response, Guttman's partial correlation procedure was used (i.e., The *Kaiser* was run and the total matrix sampling adequacy was greater than .500 so that Guttman's assumptions were met). The resulting matrix is shown in Figure 14.

Once these partial correlation coefficients were developed, they were converted to percentage of influence

		Outcome				Money			School System			
		BSF	STAT	TPT	MSO	CCI	APS	EPP	ADM	%SA	%OC	%FRL
Outcome	BSF	1										
	STAT	**.358**	1									
	TPT	**.387**	**.438**	1								
	MSO	**.753**	**.770**	**.793**	1							
Money	CCI	*.140*	**.368**	*.219*	***.313***	1						
	APS	*.214*	**.528**	**.272**	**.436**	**.706**	1					
	EPP	*.081*	**.354**	*.087*	*.223*	**.437**	**.783**	1				
School Sys.	ADM	*-.146*	*-.0004*	*-.061*	*-.090*	**.529**	**.410**	**.330**	1			
	%SA	**.403**	*.117*	**.418**	**.407**	*.063*	*.042*	*-.138*	*-.155*	1		
	%OC	**-.235**	**-.294**	*-.174*	**-.302**	**-.356**	**-.458**	**-.390**	*-.198*	*-.203*	1	
	%FRL	**-.347**	**-.422**	**-.362**	**-.488**	**-.533**	**-.372**	*-.003*	*.063*	**-.259**	*.191*	1
	%CL	*.188*	**.317**	*.214*	**.310**	**.338**	**.468**	**.266**	*.025*	*.209*	**-.348**	**-.321**

p .01 = **Bold**

Figure 13. Correlation Matrix for testing, money, and school system categories (Pearson).

	Z: MSO	Z: CCI	Z: APS	Z: EPP	Z: ADM	Z: %SA	Z: %OC	Z: %FRL	Z: %CL
Z: MSO	***.444***								
Z: CCI	**-.061**	***.707***							
Z: APS	**.236**	.295	***.839***						
Z: EPP	**-.003**	-.007	.741	***.735***					
Z: ADM	**-.166**	.506	.211	-.151	***.493***				
Z: %SA	**.330**	.01	.005	-.188	-.057	***.266***			
Z: %OC	**.076**	.043	.033	.146	.071	.176	***.283***		
Z: %FRL.	**.244**	.499	.24	-.394	-.391	-.008	-.005	***.586***	
Z: %CL	**-.040**	.018	.299	-.127	-.166	.105	.163	.024	***.312***

Figure 14. Guttman's Partial Correlation matrix for MSO and the other Tennessee 1989 Report Card categories.

(PI) as displayed in Table 3. Several trends emerge from this analysis. First, the eight factors investigated account for only 26.5% of whatever relates to MSO, a fact discussed in more detail in response to research question #4.

Equally interesting is the distribution of variability among the factors. Of the approximate 25% influence on MSO exerted by the combined money and school system variables, almost 11% was provided by student attendance. A student's learning and achievement are influenced by his/her presence in school. Six percent of the association with MSO was produced by socio-economic status of the community (*%FRL*); 5.6% was attributable to educator compensation (APS). Percent oversized classes accounted for only six-tenths of one

Table 3. Partial correlations and percentage of influence (PI) of each category on mean student outcome.

	r	r^2	PI (%)
Money			
County per Capita Income (CCI)	-.061	.004	0.4
Average Profession Salary (APS)	.236	.056	5.6
Expenditure per Pupil (EPP)	-.003	.00	0.0
School System			
Average Daily Membership (ADM)	-.166	.028	2.8
Percent Student Attendance (%SA)	.330	.109	10.9
Percent Oversized Class (%OC)	.076	.006	0.6
Percent Free/Reduced Lunch (%FRL)	.244	.060	6.0
Percent Career Ladder II & III (%CL)	-.040	.002	0.2
TOTAL	—	—	**26.5%**

percent of the student achievement results; affluence of the community *(CCI)* contributed only 4-tenths of one percent of the influence, and %CL contributed only two-tenths of one percent. Expenditures Per Pupil (EPP) alone showed **NO** association with MSO. Implications of these findings are discussed in response to research question #5.

2. How Do Reported School District Characteristics Interact with Each Other?

To determine the interaction of money and school system factors, they were correlated with each other. As demonstrated in Figure 13, significant ($p \leq .01$) correlations resulted for 14 of 18 combinations.

Average Professional Salary (APS) correlated significantly and positively with EPP (r=.78), CCI (r=.71), %CL (r=.47), and size of school district (r=.41). Expenditure Per Pupil (EPP) correlated significantly and positively with ADM (r=.33) and %CL (r=.27). None of these relationships is unexpected.

Significant, negative correlations occurred between the following factors:

a. CCI *and* %FRL (r= **-.53**)
b. APS *and* %OC (r= **-.46**)
c. EPP *and* %OC (r= **-.39**)
d. APS *and* %FRL (r= **-.37**)
e. CCI *and* %OC (r= **-.36**)
f. %OC *and* %CL (r= **-.35**)
g. %FRL *and* %CL (r= **-.32**)
h. ADM *and* %FRL (r= **-.26**)

Most of these negative correlations are not surprising. Since oversized classes and low socio-economic status of the community as portrayed in high percentages of free and reduced lunches are generally perceived to

have negative impact on educational outcomes, the correlations reported reinforce these perceptions and show the extent of their impact on other aspects of the educational enterprise. Several relationships demonstrated in the negative correlations reflect "common sense." It seems reasonable that lower per capita income, higher percentage of free and reduced lunches, and larger class sizes go hand-in-hand. Lower per pupil expenditures usually are associated with larger class sizes. Professional salaries are often lower in communities with fewer financial resources—communities where class sizes and numbers of free and reduced lunches will be larger. Nor is it surprising that greater percentages of upper-level Career Ladder teachers are found in communities with more money and lower class sizes.

3. **When rank ordered on the basis of student outcomes, do school districts within the state perform as expected in terms of the money and school system characteristics reported in the Report Cards?**

One might expect that school districts with money, better teacher salaries, enrollments which are not extreme (very large, very small), fewer oversize classes, higher attendance and high percent of upper-level Career Ladder teachers would produce the best MSO. In general, those expectations were confirmed in the regression analyses conducted in response to research question one. There are, however, outlier districts producing MSO significantly lower or higher than could be expected. Figures 11 and 12 pinpoint these exceptions. Tables 4 and 5 highlight these exceptions.

In Table 4, the nine highest and nine lowest ranked districts by MSO are profiled by their z-scores on the eight independent variables. The district producing the fourth highest MSO does not conform to expectations in at least four of eight areas. It has low CCI and APS, a high %FRL and a small %CL. It does not rate as high as other districts in the "top nine" category in several other areas. It would not be expected to be a "top 9" MSO school district, but it is.

The school district ranked number 117, fifth from the bottom in MSO in the sample of 121 school districts is also an "outlier." It has the second highest CCI z-score (2.04) for the 121 school districts, high APS, and large EPP as demonstrated by rank and z-scores. It is, however, a large school district as demonstrated by its z-score in that category (7.92).

Table 5 data are also useful in responding to research question #3. The nine highest performing school districts (MSO) and the nine lowest performing districts were profiled among all school districts studied on the eight independent variables.

The positional profile reveals that the third, fourth, sixth, and eighth highest performing school districts do not conform to commonly held beliefs about school district performance (e.g., a direct, positive correlation between MSO and school system data). District #3 places 73rd in CCI among 121 districts and

Table 4. Profile of Nine Highest and Nine Lowest Ranked (Rk) school districts by MSO z-score, TN: 1988-89 data.

	MONEY				SCHOOL SYSTEM			
RANK *n=*	Rk CCI *121*	Rk APS *121*	Rk EPP *121*	Rk ADM *121*	Rk %SA *121*	Rk %OC *110*	Rk %FRL *121*	Rk %CL *121*
				Top 9				
1	14	6	18	**64**	18.5	24	5.5	6
2	12	3	1	50	**73**	1	39	5
3.	**73**	59	**94**	**104**	6.5	36	44.5	**103**
4	**121**	**110**	**66**	**118**	16.5	26	**106**	**107**
5	1	27	33	11	26.5	18	1	27
6	**77**	61	64	**74**	65	**92**	**84**	37
7	66	8	6	**78**	8	2	44.5	60
8	**73**	**71**	**85**	**119**	6.5	na	**87.5**	8
9	14	1	2	**108**	11.5	na	33	3
				Bottom 9				
113	99	90	78	80	84.5	**44**	79.5	62
114	80	82	84	**51**	**9**	na	116	74.5
115	105	120	111	101	80.5	107	74	114
116	88	105	**48**	**44**	106	**43**	112.5	78.5
117	**3.5**	**13**	**13**	**1**	84.5	**27**	118	**48**
118	117	119	**42**	84	117	101	112.5	88.5
119	103	80	**34**	**23**	**121**	64	109	104
120	63	121	90	**45**	60.5	97	120.5	119
121	108	115	116	87	120	108	84	116

Underlined = a 60 ranking difference between the district's MSO rank and the individual category rank.

94th in EPP. It is a small (*104th ranking*), rural school district with relatively few Career Ladder teachers (*103rd ranking*).

School district #4 has the lowest per capita income among districts in the sample (*121st ranking*). It is 110th in per pupil expenditure and 66th in professional salary. It is also a small, rural school district *(118th ranking)* with many students on free or reduced lunches (*106th position*) and few Career Ladder teachers (*107th position*). However, it is tied for 16th place in attendance rate and only 26th in oversized classes, a statistic which indicates fewer oversized classes than roughly four-fifths of the districts studied.

The school district with the 6th highest MSO consistently placed in the lower half of the districts in the sample in all factors except %CL teachers where it ranked at the bottom of the upper quartile.

Table 5. Profile of Nine Highest and Nine Lowest Ranked School Districts by MSO z-score, TN; 1988-89 data.

	OUTCOME		MONEY			SCHOOL SYSTEM			
	MSO	CCI	APS	EPP	ADM	%SA	%OC	%FRL	%CL
n	*121*	*121*	*121*	*121*	*121*	*121*	*110*	*121*	*121*
				Top 9					
RANK									
1	1.97	**1.00**	**2.18**	0.91	-0.26	0.92	0.87	**1.30**	**1.81**
2	1.40	**1.44**	**2.67**	**3.64**	-0.18	-0.20	**1.39**	0.53	**2.06**
3	1.26	-0.24	-0.10	-0.66	-0.42	**1.79**	0.59	0.46	-0.90
4	1.20	-2.00	-1.14	-0.29	-0.47	0.99	0.81	-1.39	-1.01
5	1.17	**4.31**	0.61	0.16	0.36	0.68	0.98	2.11	0.64
6	1.50	-0.28	-0.17	-0.27	-0.30	-0.04	-0.86	-0.16	0.38
7	1.14	-0.13	**1.69**	**2.87**	-0.31	**1.71**	**1.34**	0.46	-0.16
8	1.12	-0.24	-0.37	-0.55	-0.47	**1.79**	na	-0.22	**1.62**
9	1.11	**1.00**	**3.66**	**3.24**	-0.43	**1.31**	na	0.60	**2.36**
M		0.51	1.00	1.00	-0.27	0.99	0.73	0.41	0.75
				Bottom 9					
113	-1.04	-0.78	-0.71	-0.45	-0.32	-0.42	0.34	-0.09	-0.21
114	-1.17	-0.35	-0.60	-0.54	-0.19	1.47	na	**-2.08**	-0.35
115	-1.29	**-1.07**	**-1.31**	-0.93	-0.40	-0.36	**-2.65**	-0.02	**-1.33**
116	-1.33	-0.47	-0.98	-0.10	-0.14	**-1.00**	0.39	**-1.60**	-0.40
117	-1.43	2.04	1.34	1.22	7.92	-0.44	0.78	**-2.36**	0.16
118	-1.55	**-1.59**	**-1.31**	-0.05	-0.34	**-2.04**	**-1.44**	**-1.60**	-0.60
119	-1.77	**-1.03**	-0.55	0.15	0.02	**-2.92**	-0.05	**-1.53**	-0.94
120	-2.14	-0.13	**-1.36**	-0.61	-0.14	0.01	**-1.12**	**-3.18**	**-1.75**
121	-2.53	**-1.23**	**-1.20**	**-1.12**	-0.34	**-2.76**	**-2.65**	-0.16	**-1.39**
M		-0.51	-0.74	-0.27	0.67	-0.94	-0.80	-1.40	-0.76

Bold = MSO z-score and category z-score ***are*** similar *(i.e., both are either positive or negative and are greater than one)*.

Underline = MSO z-score and category z-scores are ***not*** similar *(i.e., if one is a positive one or larger SD, the other item is a negative one SD)*.

The eighht highest performing school district demonstrated a profile similar to district #4, except that its attendance was better (*6th position*), and it had a higher %CL (*8th position*).

The MSO factor in all of these districts is relative. These top nine are the best performing school districts in the state, but the state averages typically do not place Tennessee schools among the best performers in the country. It is clear, however, that money is not the most critical factor in MSO in TN's "high flyers." If any factors seem to be positively associated with student outcomes more than any others, they are size of school district (ADM) and class size (%OC). However, there are districts that do not have the highest ADM or lowest %OC

that outperform the majority of districts in the state. Further, we know that these two factors have relatively little influence (2.8% and 0.6%) on MSO. Some other factors, not present in these report cards but associated with student achievement, are operating.

The analysis of the nine worst-performing districts confirms the findings on the other end of the spectrum. Some profiles among this group do not conform to commonly held beliefs or even to the patterns of the "outlier" schools with top performance rankings. The school district ranked 117th is a case in point. It ranks among the top districts in the state in all three money factors, in the top quartile (*small %OC*), and in the top half of the districts in the state in %CL. Yet it has relatively low %FRL (*118th position*) and is fifth from the last in MSO. The factors that might contribute to low performance are the large size of the school district (*1st ranking*), low student attendance (ranks in the bottom third of districts) and low socio-economic status of the community (*118th in free/reduced lunches*). However, other districts with similar features (*except size*) did far better in student performance.

The findings in response to research question #3 present a mixed message. Not all districts performed as one could have expected.

4. Do the reported school district characteristics appear to represent all factors which relate to student academic achievement?

The answer to this question is clearly "no." The partial correlation and percentage of influence analyses reported in response to research question #2 (see Table 3) indicated that the eight factors studied as independent variables accounted for only one fourth of the influence on student outcomes. The ranking analysis conducted in response to research question #3 also suggested that in both the highest and lowest performing school districts, factors other than those reported in the report cards were at work. Almost three-fourths of whatever accounts for student academic performance is unknown based on these report cards--in contradiction to the "folk wisdom" of the day.

5. Do "outlier" school districts significantly influence the finding of this study?

As described in the Methodology section of this paper, two procedures were used to develop answers to this question[1]. First a truncated MSO correlation coefficient was established for the interaction of each independent variable with the MSO of the "middle" 97 school districts. The 97 school districts used in this computation were determined by eliminating the top 10% and bottom 10% of school districts on the ranking

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1. It should be pointed out that the Durbin-Watson test was applied to the available data before either the original analysis or the the analysis reported here were conducted. It indicated that the independent variables were indeed independent, both collectively and individually.

continuum for each independent variable. Here, the data were truncated to fulfill the Pearson Product Moment correlation assumptions of *bivariate normal distribution* and *homoscedasticity*. This alternative statistical analysis was used to compare the "r" with the Polynomial regression "r". A second step in both procedures was application of Fisher's Zr-transformation to determine the significance between the original correlation coefficients and the coefficients produced by the newly applied procedures.

The results of the "truncated MSO" procedure are presented in Table 6 and Figures 15 through 22. These graphic representations are presented to the reader in the following paragraphs with brief explanations of their contents as compared to the findings reported for research question #2.

Table 6 depicts significant relationships between the correlation coefficients established for four variables: average professional salary, percentage of student attendance, percentage of oversize classes and percentage of students on free and reduced lunch. Only one of these interactions was significant at the .05 level: Average Professional Salary (APS). When reviewing the trends depicted in Figures 15-22, significance should be kept in mind.

The impact of the deletion of "outlier" school districts from consideration can be better seen in the figures presented below. Trendlines generated in these figures can be compared with those displayed in Figures 3 through 11 on pages 10 through 17 of this report.

Table 6

AREA	MSO *n=121*		MSO Truncated *n=97*		Difference		
	r	z	r	z	r	z	t
CCI	.313	.321	.421	.448	.108	.127	.919
APS	.436	.466	.228	.229	.208	.237	1.714 **
EPP	.223	.224	.084	.084	.139	.140	1.013
ADM	-.090	.090	-.032	.032	.058	.058	.420
%SA	.407	.430	.210	.213	.197	.217	1.570 *
%OC	-.302	.310	-.126	.127	.176	.183	1.323 *
%FRL	-.488	.530	-.288	.293	.200	.203	1.468 *
%CL	.310	.321	.200	.203	.110	.118	.854

* p≤.10
** p≤.05

Figure 15 displays a positive correlation between County Per Capita Income (CCI) and MSO, when the truncated MSO procedure is applied. Comparison of Figure 15 with Figure 3 (p. 10) shows their similarity. The correlation and resulting trend line are simply not as pronounced (steep) when the counties with highest and lowest CCI are removed from consideration (r=.313 , 421, respectively).

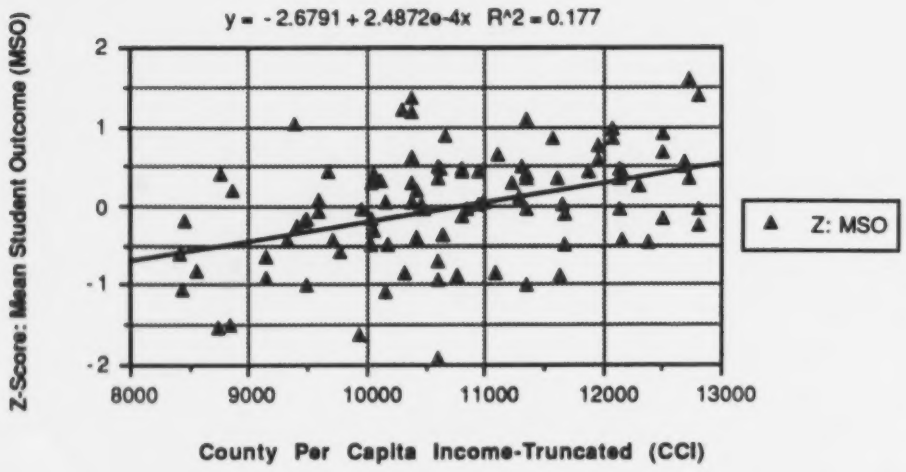

Figure 15 Relationship of Truncated County Per Capita Income (CCI) to MSO

Figure 16 displays a positive correlation between Average Professional Salary and MSO, as did Figure 4 (p. 11) in the initial analysis. The deletion of outlier districts decreases the slope of the trend line markedly. The significance of the correlation between the correlation coefficients (r=.436,.228, respectively) produced in the original analysis and the "truncated MSO" analysis (Table 6) suggests that salaries in the outlier school districts "drove" the degree of relationship found between these variables in our first analysis.

Figure 17 should be compared with Figure 5 (p. 11). Again, the reader will note a positive relationship between Expenditure Per Pupil (EPP) and MSO. However, the "truncated MSO" analysis levels the trend line considerably. Obviously, outlier school districts expending much smaller or much greater amounts of money than the vast majority of districts in the state influence the relationship of variables reported in the first analysis greatly.

Figure 18 depicts the relationship of school district size (Average Daily Membership) to MSO using the "truncated MSO" analysis. When comparing the trendline in Figure 18 to Figure 6 (p. 13), we see that the very small and/or very large districts in the state accounted for all the negative correlation found in the first analysis. Apparently, school district size influences student outcomes most negatively when a school district is very

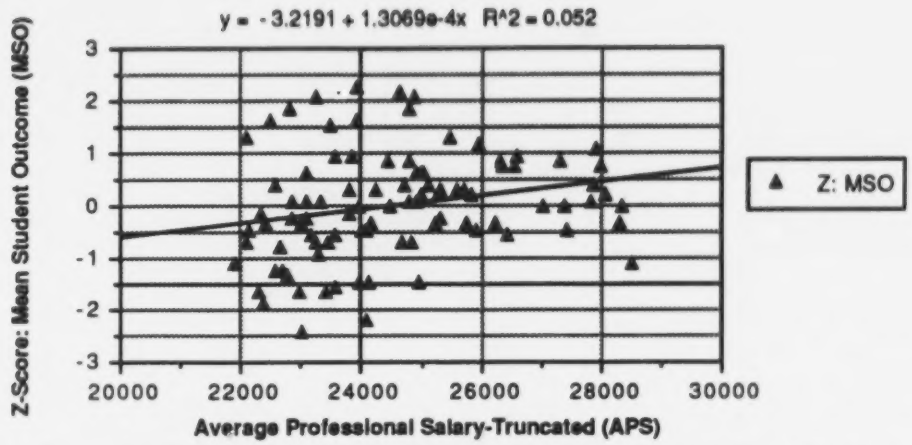

Figure 16 Relationship of Truncated Average Professional Salary (TAPS) to MSO.

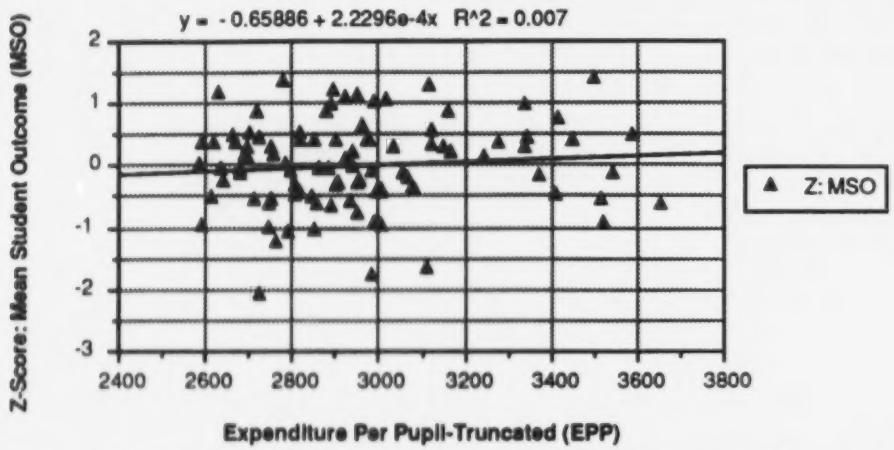

Figure 17 Relationship of Truncated Expenditure Per Pupil (EPP) to MSO.

large. However, in reviewing these two figures it should be remembered that neither correlation was significant.

Figure 19, like its counterpart, Figure 7 (p. 13) displays the relationship between student attendance-truncated (%SAT) and MSO. Obviously, the relationship is positive (significantly so) in both analyses, but the outlier school districts had profound effect on the slope of the trendlines. It is difficult to conclude exactly what the relationship of attendance to student outcomes is when studying these two figures.

The effects of oversized classes-truncated (%OC) on student outcomes is re-examined in Figure 20. (For comparison, see Figure 8, p. 14). While the "truncated MSO" analysis yields a slight

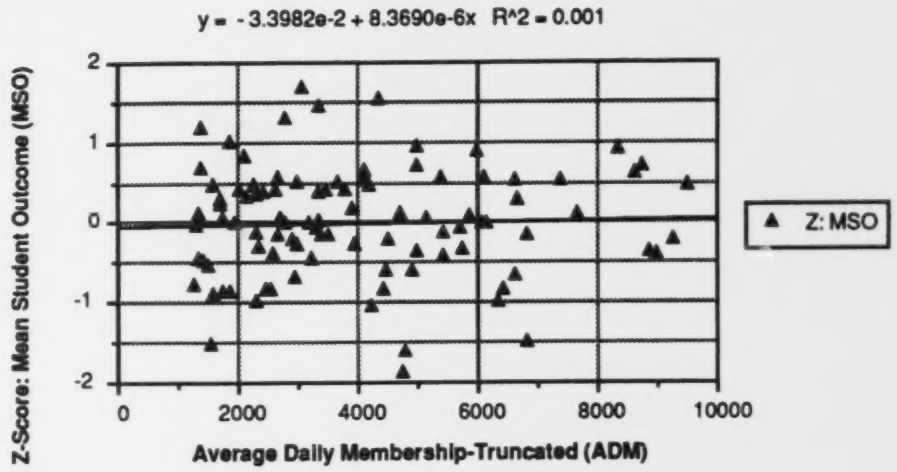

Figure 18 Relationship of Truncated Average Daily Membership (ADM) to MSO.

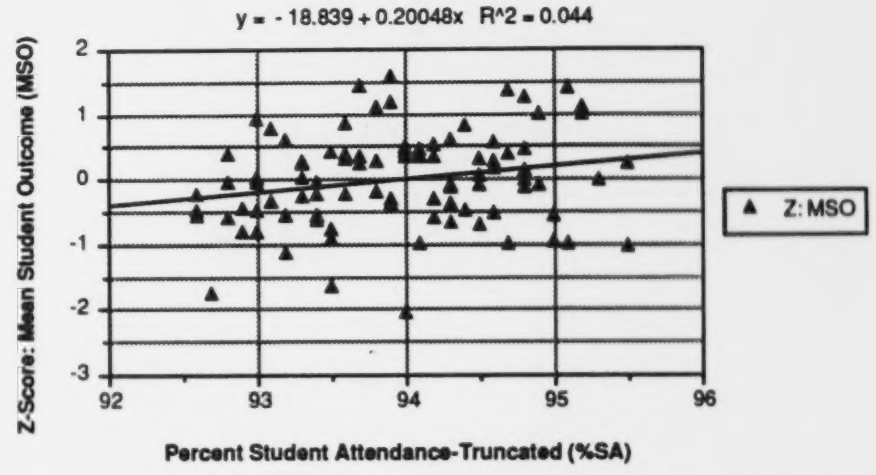

Figure 19 Relationship of Truncated Percentage Student Attendance (%SA) to MSO.

negative relationship, the trendline in the initial analysis containing outlier school districts was much steeper. Comparison of the initial points on the lines demonstrates only small differences. Very small numbers of oversized classes do not effect current student outcomes in a school district greatly. Large percentages of oversized classes do have substantial negative impact. What cannot be determined from the available data is the impact of class sizes lower than present state standards. However, those who deliberate this issue must remember that class size does not appear to have much influence on student outcome, only 0.6% in this investigation.

Results of the "truncated MSO" analysis of the impact of socio-economic status (as seen through

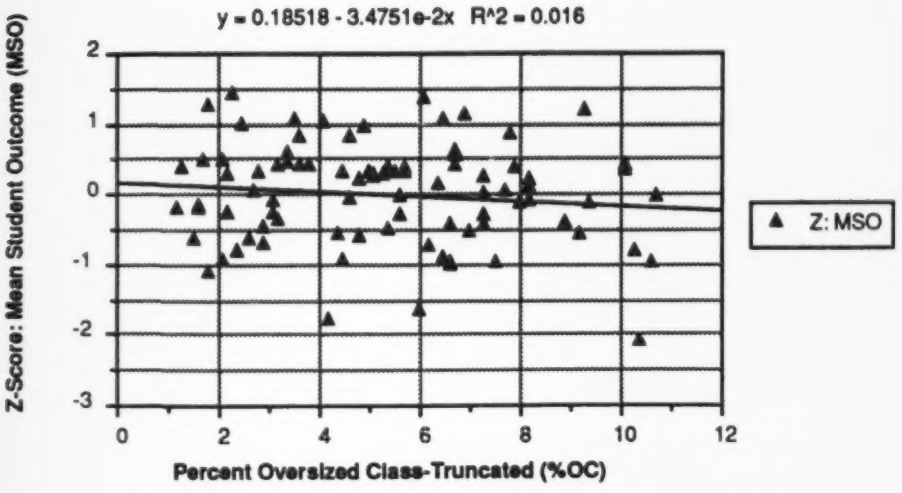

Figure 20 Relationship of Percent Oversized Class -Truncated ((%OC) to MSO.

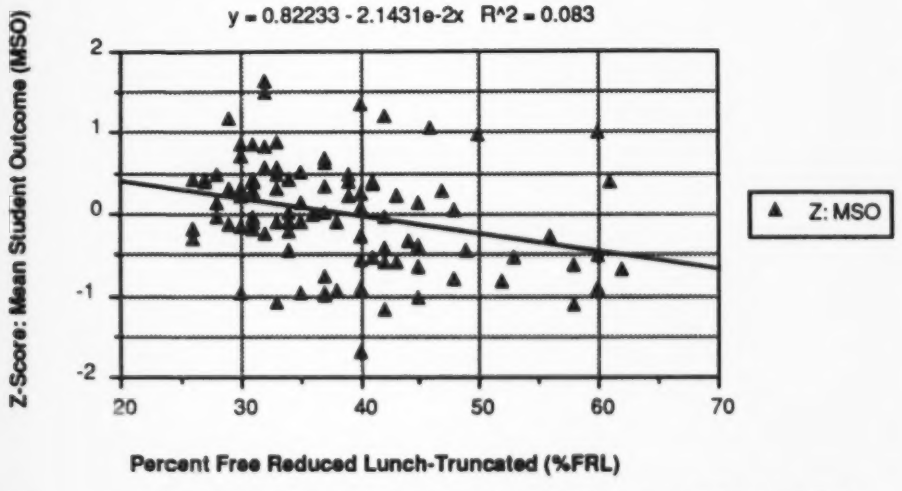

Figure 21 Relationship of Percent Free Reduced Lunch -Truncated (%FRL) to MSO.

percentage of students on free and reduced lunches) are displayed in Figure 21. The comparable figure in the original analysis is Figure 9 (p. 14). In both analyses, greater numbers of students on free and reduced lunches correlate negatively with MSO as reported in Table 6. However, the negative relationships were reduced significantly when outlier school districts were removed from the analysis. Obviously, extreme socio-economic conditions in a community as demonstrated by 70 percent or more of students receiving free and reduced lunches, impact student outcomes more dramatically than less pervasive conditions.

In Figures 22 (below) and Figure 10 (p. 15), we see portrayals of the impact of Career Ladder teachers and student outcomes. In both "portraits", the relationships are positive; i.e., the greater the number of Career Ladder teachers, the higher the outcomes. However, it appears that substantial concentrations (above 30 percent) of these teachers in the outlier schools (Figure 10) have much greater impact on student achievement than do scatterings of these teachers. The results of the polynomial regression analysis will show that this may not be the case, however.

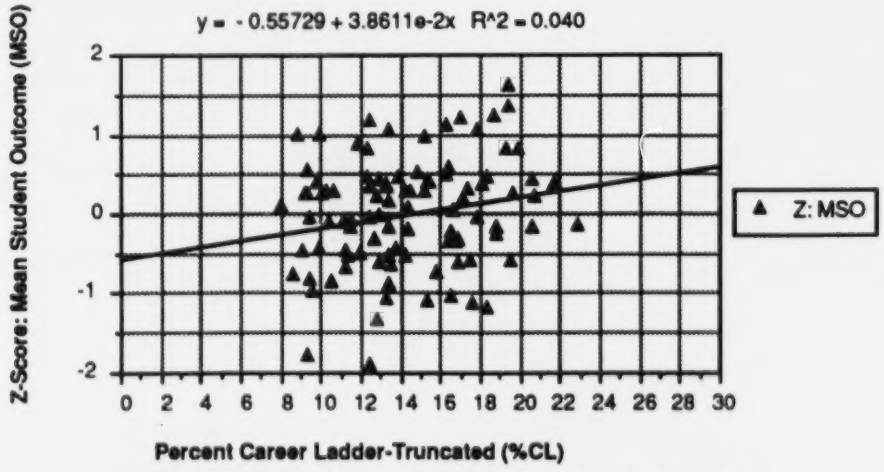
y = - 0.55729 + 3.8611e-2x R^2 = 0.040
Z-Score: Mean Student Outcome (MSO)
2
1
0
-1
-2
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Percent Career Ladder-Truncated (%CL)
Z: MSO

Figure 22 Relationship of Percent Career Ladder -Truncated (%CL) to MSO.

In essence, the several findings resulting from the "truncated MSO" analysis of available data lead to the single general finding that the outlier school districts (top 10% and bottom 10%) as defined within each independent variable substantially impact the relationships between that variable and MSO, not in nature or direction of the relationship, but in its intensity.

V. CONCLUSIONS AND IMPLICATIONS OF THE STUDY

Investigators framed a fifth research question as a means of targeting conclusions and implications in a useful way:

6. **How might the findings of this study inform educational policy and policymakers at the state and local levels?**

Several points seem clear. "Good" inputs to the educational process (*money, small classes, good community*, etc.) do not guarantee high student achievement. If we want student achievement, we must stress outputs (outcomes) not inputs. Inputs commonly assumed to be associated with outputs account for only minor variation in performance outcomes (just over one-fourth). Further, the individual influence of most

of these factors (with the exception of attendance) is minor; debate over and attention to any one in isolation is a wasteful activity. If we want to impact student performance, a comprehensive approach which addresses all factors is needed.

Policymakers need to consider these points carefully. In recent years, there have been attempts to compromise comprehensive educational reform packages by putting major emphasis and resources into one or two strongly lobbied dimensions of the comprehensive plan. While this approach may soothe feelings, it will do little to improve student achievement.

Another conclusion of the study is that we are not yet talking about, dealing with and reporting many important influences on student outcomes. What are they? We need more research into the cause and effect relationships.

On the other hand, we may know more than we're measuring and reporting. It is currently popular to talk about restructuring schools, teaching and learning conditions and parent-school relationships. Some educators suggest and have some research to support the suggestion that student motivation and self-concept, student and educator attitudes, school climate, teaching strategies, administrator and teacher styles and parent involvement in schools must change before much change will be seen in student academic achievement. Those factors can be rather easily measured and reported, as innovative schools such as those in the RJR Nabisco Foundation's Next Century Schools Project, the Coalition of Essential schools and other such endeavors are proving. How much influence do some of these other factors contribute to MSO? Modifications in school assessment requirements and report card inclusions could soon tell us.

There is also the problem of assessing what students know and are able to do. The investigators used available, reported test results in these analyses. Therefore, the findings are only as good as the test results. There is great debate about the value of present tests—both their content and format, and there is great demand for new and different assessments. If the test results used to form the dependent variable in this study (MSO) were not measuring the right things or were not measuring them validly and reliably, all other findings are of little value. We (the investigators) have no basis upon which to challenge any of the tests currently in use in Tennessee. The only statistical eccentricity noted as the various analyses were performed was the fact that correlations between the factors studied and student achievement were usually stronger when the single outcome measure of achievement was a nationally produced test: The Stanford Achievement Test, Task II, rather than a state-specific test —the Basic Skills or Proficiency test.

The use of the analysis procedures in response to research question 5 also yields important conclusions and implications. When attempting to create a statewide profile of relationships, we found that data from "outlier" school districts influenced the profile greatly. The same situation probably exists when profiles are

created at a district level. "Outlier" schools within the district are likely to influence the district profile. For both accountability and school improvement purposes, building level data are probably the most useful and the most valid data available.

The "outlier" schools found also offer additional food for thought. The data analyzed in this study suggest that individual schools and school districts have overcome the presence of negative community and resource factors. We must determine how they have been able to do that, so that their experiences can be replicated. We can no longer accept the proposition that student outcomes are pre-determined by existing conditions.

Finally, there is a note for those who are contemplating, creating or modifying report cards on schools. If the entries on those report cards are similar to those investigated in this study, they provide interesting statistics but only a small amount of information which can be of use in improving education. Further, whatever information is entered into the report card is of minimal use until additional analyses such as those conducted in this study are performed.

IX. REFERENCES

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